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A STUDY OF THE DECAY RATE OF OMITE (PROPARGITE) AS A FOLIAR SPRAY ON STRAWBERRIES IN VENTURA COUNTY, CALIFORNIA APRIL - 1977

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SUMMARY

As a part of the continuous investigations of the Worker Safety Unit into potential worker health and safety hazards, a study was initiated to determine the decay rate of Omite (propargite) on strawberry plants and berries when applied as a foliar spray. The study took place on a 95-acre strawberry field located in Ventura County, during the month of April 1977. This field was treated with the following pesticides: Topsin 50% WP - 1 lb/acre, Dibrom 8-E - 1 pint/acre, Thylate (thiram) - 2 lbs/acre, and Omite 30W - 5 lbs/acre. Approximately seven days after this application, the total Omite residue found in and on the strawberry leaves was 51.0 ppm. The surface residue found on the leaves was 15.6 ppm, and the total Omite residue on the strawberries was less than 0.1 ppm.

DISCUSSION

Omite is an acaricide with contact and residual killing action. It has an oral LD_{50} (rat) of 2,200 mg/kg. This pesticide is a known skin irritant and can cause dermatitis when it comes in contact with the skin, especially if a person is hot and sweaty. This study was conducted to establish the levels of pesticide residue on strawberry plants that workers might come in contact with.

Propargite is used to control many types of mites, including the Pacific spider mite, the strawberry spider mite, and the two-spotted spider mite. Omite is registered for use on almonds, apples, apricots, corn, cotton, grapefruit, grapes, lemons, oranges, peaches, plums, potatoes, prunes, strawberries, and walnuts. This pesticide does not affect bees and is less harmful than any other acaricide to predatory mites.

Omite is available as a 30% wettable powder (the formulation used in this study), emulsifiable concentrates, and as a 4% dust. In 1977, over 5,900 pounds of Omite were reported applied to more than 3,500 acres of strawberries in California. Since Omite is not a restricted material, sizable additional amounts are applied by growers that are not included in this total.

During the month of April 1977, foliage and commodity samples were taken from a strawberry field that had been treated with Omite. These samples were taken for the purpose of establishing a decay rate curve for this pesticide. The study was conducted on a 95-acre strawberry field located in Ventura County that was treated April 7, 1977. This field received a ground application of Omite at the rate of five pounds of pesticide per acre. The same field had beem treated 12 days earlier with one pound of Benlate (benomyl) per acre and two pounds of Orthocide (captan) per acre in 20 gallons of water (aerial).

Five to ten pounds of Omite per acre in 100-200 gallons of water is the proper application rate for treating strawberries according to the product label. The product label also states not to apply more than three applications of Omite in a 40-day period during the harvesting period, and that the last application must be made at least three days prior to strawberry harvest. The established Omite residue tolerance on strawberries is 7 ppm.

Foliage samples and commodity samples were drawn at the following intervals after pesticide application: one and one-half hours, one day, five days, six days, and seven days. Duplicate foliage samples consisted of approximately 100 leaf discs, 2.5 cm in diameter. The commodity sample consisted of approximately 25 strawberries. All samples were collected along the same diagonal path across the field. The foliage samples were analyzed for surface and total residues while the commodity samples were analyzed for total residue only. All samples were refrigerated with wet ice prior to delivery to the Department of Food and Agriculture's mobile Worker Safety Chemical Laboratory located adjacent to the El Rio Drive, Ventura County Agricultural Commissioner's field office in Oxnard.

Results

The weather conditions during the study are recorded in Table 1. The average maximum and minimum temperatures during the study were 67.9° F and 47.4° F, respectively. There was no rainfall during the study period.

Total and surface residues on the foliage are recorded in Table 2 and are plotted on Figure 1. Approximately seven days after application, the total Omite residue found in and on the strawberry leaves was 51.0 ppm and the Omite surface residue on the leaves was 15.6 ppm. The total Omite residue found on the strawberries is recorded in Table 3. The residue found on the strawberries one and a half hours post application was less than 0.1 ppm.

ANALYTICAL METHODS (EXTRACTION)

The procedure used for the extraction of dislodgeable and total residues from leaf punches was originally published by Gunther in "The Bulletin of Environmental Contamination and Toxicology," 9, 243-249, 1973. It has been documented several times in detail, with modifications to accommodate the various pesticides and their metabolites, that our Department's Worker Safety Unit has been concerned with.

The sample container and leaf punches are weighed and the gross weight recorded.

Total Residues

1. The leaf punches are transferred to a blending jar. The empty sample container is again weighed and the net weight of the punches recorded.

2. Approximately 50 gms of sodium sulfate and 100 mls of ethyl acetate are added.

3. The sample is blended at high speed for 3 minutes, keeping the blender cup cool by immersing it in a container of cool water. The blender cup is removed and the sample allowed to settle.

4. An aliquot is decanted into a teflon-capped bottle and stored in the freezer prior to clean up and analysis.

Dislodgeable Residues

1. Fifty mls of water and approximately 4 drops of Sur-Ten solution (1:50) are added to the sample containers. The containers are capped and placed in a multi-purpose rotator and rotated at 30 cycles/min. for 60 min. The aqueous solution is decanted through a glass wool plug into a 500 ml separatory funnel.

2. The punches are rotated a second time, using 50 mls of water and 4 drops of Sur-Ten solution, for 30 min. This is added to the first extraction.

3. The sample is then hand-shaken for approximately 10 secs with 30 mls of water. The container is drained into the separatory funnel with the first two extractions.

4. The aqueous solution is extracted three times with 50 mls of ethyl acetate. The extract is filtered through sodium sulfate into a glass stoppered mixing cylinder and the volume is recorded. The extract is mixed in the cylinder. An aliquot is decanted into a teflon-capped bottle and stored in the freezer prior to clean up and analysis.

The residue in the fruit was run the same way as total in the foliage.

ANALYTICAL METHODS (CHROMATOGRAPHY)

Instrument: Varian 2100
Detector: Flame photometric, sulfur filter, attenuation 64 x 10^{-9}
Column: 6' x 2mm I.D.; 50/50 mix 4% OV-101 and 6% OV-210 on 100/120 Gas Chromasorb Q
Column temp: 230° C
Carrier gas: Nitrogen at 30 ml/min
Retention time: 3.0 min

TABLE I

DAILY TEMPERATURE AND PRECIPITATION
OBSERVATIONS TAKEN AT WEATHER STATION
OXNARD, CALIFORNIA

DATE (1977)	TEMPERATURE MAXIMUM - °F	TEMPERATURE MINIMUM - °F	PRECIPITION INCHES
4-7	67	50	0.0
4-8	65	51	0.0
4-9	66	51	0.0
4-10	67	44	0.0
4-11	69	45	0.0
4-12	69	47	0.0
4-13	70	41	0.0
4-14	70	50	0.0
Average	67.9	47.4	0.0

TABLE II

OMITE (PROPARGITE) RESIDUES ON STRAWBERRY FOLIAGE
APRIL 1977

APRIL 1977	SAMPLE INTERVAL	OMITE RESIDUE (PPM) SURFACE	TOTAL
7	1.5 hours	37.8	139.0
8	1 day	52.3	94.0
12	5 days	17.9	45.4
13	6 days	24.0	51.7
14	7 days	15.6	51.0

Limit of Detection is 1.0 ppm

TABLE III

OMITE (PROPARGITE) RESIDUES ON STRAWBERRIES
APRIL 1977

APRIL 1977	SAMPLE INTERVAL	OMITE RESIDUE (PPM) TOTAL
7	1.5 hours	less than 0.1
8	1 day	less than 0.1
12	5 days	less than 0.1
13	6 days	less than 0.1
14	7 days	None Detected

Limit of Detection is 0.1 ppm

Addendum to HS-577
Recalculation of Dislodgeable Residues

Results of Analysis of Strawberry Foliage for
Dislodgeable Residues of Propargite

Sample Interval	Residue (ug/cm2)
Pre-app	ND
Pre-app	ND
1.5 hrs.	.222
24 hrs.	.307
5 days	NS
6 days	NS
7 days	.102

ND - none detected
NS - no sample or missing data